

Application No. 10/609,486

- 2 -

January 26, 2005

IN THE CLAIMS

Cancel claims 1 to 20 and insert new claims 21 to 44:

21. (New) A current sensor for measuring a time varying current flowing through a conductor, comprising:

a plurality of planar insulating substrate elements substantially equidistant from a central cavity for receiving the conductor, said substrate elements being aligned with angularly spaced planes that are oriented in substantially axial and radial directions relative to the axis of said cavity, and with at least one surface coil defined on a single surface of each said substrate element, said coils being electrically interconnected such that output voltages of said coils are combined and applied to output terminals of said sensor, wherein at least a plurality of the substrate elements are interconnected with each other with twisted pair wire.

22. (New) A current sensor according to claim 21 wherein a surface coil comprises a conductive track on a surface of a substrate.

23. (New) A current sensor according to claim 22 wherein at least one surface coil is provided on an opposite surface of a substrate element.

24. (New) A current sensor according to claim 23 wherein at least two surface coils on opposite surfaces of a substrate element are connected through a via.

25. (New) A current sensor according to claim 22 wherein a surface coil includes a plurality of nested conductive turns.

26. (New) A current sensor according to claim 25 wherein the amount of substrate area occupied by a turn is very small compared to the area enclosed by said turn.

27. (New) A current sensor according to claim 21 wherein the substrate elements are all spaced at equal angles.

28. (New) A current sensor according to claim 21 wherein the substrate elements are uniformly spaced at unequal angles, while oriented with symmetry about the axis of the central cavity.

Application No. 10/609,486

- 3 -

January 26, 2005

29. (New) A current sensor according to claim 27 further comprising a housing in which the coils are disposed, the housing being divided into at least two sections, such that said sections may be spread apart, to allow entry of said conductor into said cavity.

30. (New) A current sensor according to claim 28 further comprising a housing in which the coils are disposed, the housing being divided into at least two sections, such that said sections may be spread apart, to allow entry of said conductor into said cavity.

31. (New) A current sensor according to claim 29, wherein the mating surfaces of the two sections are located between substrates, so as to provide a separation distance between the mating surfaces and the coil conductors.

32. (New) A current sensor according to claim 30, wherein the mating surfaces of the two sections are located between substrates, so as to provide a separation distance between the mating surfaces and the coil conductors.

33. (New) A current sensor for measuring a time varying current flowing through a conductor, comprising:

a plurality of planar insulating substrate elements substantially equidistant from a central cavity for receiving the conductor, said substrate elements being aligned with angularly spaced planes that are oriented in substantially axial and radial directions relative to the axis of said cavity, and with at least one surface coil defined on a single surface of each said substrate element, said coils being electrically interconnected such that output voltages of said coils are combined and applied to output terminals of said sensor, wherein at least a plurality of the substrate elements are integral with each other, being sections of a flexible substrate strip.

34. (New) A current sensor according to claim 33 wherein a surface coil comprises a track on the surface of the substrate strip and electrical interconnections between the coils are defined by tracks on the substrate strip.

35. (New) A current sensor according to claim 34 wherein at least one surface coil is provided on an opposite surface of a substrate element.

36. (New) A current sensor according to claim 35 wherein at least two surface coils on

Application No. 10/609,486

- 4 -

January 26, 2005

opposite surfaces of a substrate element are connected through a via.

37. (New) A current sensor according to claim 34 wherein a surface coil includes a plurality of nested conductive turns.

38. (New) A current sensor according to claim 37 wherein the amount of substrate area occupied by a turn is very small compared to the area enclosed by said turn.

39. (New) A current sensor according to claim 33 wherein the substrate elements are all spaced at equal angles.

40. (New) A current sensor according to claim 33 wherein the substrate elements are uniformly spaced at unequal angles, while oriented with symmetry about the axis of the central cavity.

41. (New) A current sensor according to claim 39 further comprising a housing in which the coils are disposed, the housing being divided into at least two sections, such that said sections may be spread apart, to allow entry of said conductor into said cavity.

42. (New) A current sensor according to claim 40 further comprising a housing in which the coils are disposed, the housing being divided into at least two sections, such that said sections may be spread apart, to allow entry of said conductor into said cavity.

43. (New) A current sensor according to claim 41 wherein the mating surfaces of the two sections are located between substrate sections, so as to provide a separation distance between the mating surfaces and the coil conductors.

44. (New) A current sensor according to claim 42 wherein the mating surfaces of the two sections are located between substrate sections, so as to provide a separation distance between the mating surfaces and the coil conductors.